

WHAT IS CLAIMED IS:

1. A flexible catheter having a distal section insertable into a patient's vasculature, over a guidewire, for removing an obstructive material from the vasculature, comprising:
  - a flexible outer tube with smooth inner and outer walls and an open distal end;
  - a flexible guidewire shield, in the form of an inner tube with smooth inner and outer walls and an open distal end, slidable over said guidewire and nested in said outer tube;wherein said outer tube and said guidewire shield are connected to a proximal base and form between them an unobstructed void that is connected to negative pressure by a conduit, wherein said guidewire shield is coupled to and rotatable by a motor, said rotation reducing the frictional resistance to the sliding of said guidewire shield over said guidewire as well as reducing the frictional resistance to the movement of obstructive material through said void, and wherein said distal ends of said outer tube and said guidewire shield are adjacent to each other so that said guidewire shield does not extend substantially beyond said distal end of said outer tube, and wherein said distal section of said catheter consists essentially of said distal portion of said outer tube and said distal portion said guidewire shield and wherein said guidewire shield has no connection to any element for cutting or fragmenting said obstructive material.
2. A catheter as in claim 1 wherein a radius of bending of said outer tube at the proximal base is limited by a radius of a wall of a depression formed in said proximal base around the point at which said outer tube is connected to said proximal base .
3. A catheter as in claim 1 having a valve interposed along said conduit for selectively opening said conduit.
4. A catheter as in claim 1 wherein said motor is connected to a power source through a manual switch.

5. A catheter as in claim 1 wherein said motor is connected to a power source through a manual first switch and through a second automatic switch that periodically changes the direction of rotation of the inner tube.

6. A catheter as in claim 1 wherein at least a section of said catheter is radio-opaque.

7. A catheter as in claim 1 wherein said void is connected to a first injector means for injecting fluid through said void into the vasculature and alternatively for creating with said first injector means negative pressure in said void.

8. A catheter as in claim 1 wherein said guidewire shield is connected to a second injector means.

9. A catheter as in claim 1 wherein said guidewire shield has a non-circular cross section.

10. A method for removing an obstructive material from within a patient's vasculature utilizing a flexible catheter slideable over a guidewire that has a rotatable guidewire shield in the form of an inner tube, nested in an outer tube, said tubes having open distal ends, said tubes' distal ends being adjacent to one another, said tubes defining between them an unobstructed void, having an open distal end and a distal section of said catheter consists essentially of the distal portions of said tubes, said inner tube having no connection to any element for cutting or fragmenting said obstructive material so as to minimally disturb the material in the vasculature prior to aspirating it into the void,

said method comprising the following steps:

introducing the guidewire through the patient's vasculature to the vicinity of the obstructive material;

inserting into said vasculature, over said guidewire, a distal section of the catheter to the vicinity of the obstructive material while selectively rotating the inner tube as needed to reduce the frictional resistance between said catheter and the guidewire;

connecting said void to negative pressure to aspirate said obstructive material into said void while selectively rotating the inner tube as needed to keep the material moving through said void while minimally disturbing the material in the vasculature; and  
withdrawing the catheter from the patient.

11. A method as in claim 10 with the additional step of injecting radio-opaque fluid through said void into the patient's vasculature prior to connecting said void to negative pressure.

12. A method as in claims 11, further comprising the step of infusing fluid through said inner tube into the patient's vasculature.

13. A method as in claims 10, wherein the catheter is introduced into the patient's vasculature through a percutaneous access device.

14. A method for removing an obstructive material from within a patient's vasculature utilizing a flexible catheter slideable over a guidewire that has a guidewire shield, in the form of an inner tube, nested in an outer tube, said tubes having open distal ends, said tubes' distal ends being adjacent to one another, said tubes defining between them a void that is unobstructed by mechanical hardware and has an open distal end and a distal section of said catheter consists essentially of the distal portions of said tubes, said inner tube having no connection to any element for cutting or fragmenting said obstructive material so as to minimally disturb the material in the vasculature prior to aspirating it into the void,

said method comprising the following steps:

introducing a guidewire through the patient's vasculature to the vicinity of the obstructive material;

